FA30 Motherboard

SBC with Freescale iMX6Q Processor

User Manual / Engineering Spec.

Version 1.0

FCC Statement

This device complies with part 15 FCC rules. Operation is subject to the following two conditions：

- This device may not cause harmful interference.
- This device must accept any interference received including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a class "a" digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at him own expense.

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Warranty

We warrant that each of its products will be free from material and workmanship defects for a period of one year from the invoice date. If the customer discovers a defect, We will, at its option, repair or replace the defective product at no charge to the customer, provided it is returned during the warranty period of one year, with transportation charges prepaid. The returned product must be properly packaged in its original packaging to obtain warranty service.

If the serial number and the product shipping data differ by over 30 days, the in-warranty service will be made according to the shipping date. In the serial numbers the third and fourth two digits give the year of manufacture, and the fifth digit means the month (e. g., with A for October, B for November and C for December).

For example, the serial number 1W11Axxxxxxxx means October of year 2011.

Packing List

Before using this Motherboard, please make sure that all the items listed below are present in your package：

- FA30 Motherboard
- User Manual

If any of these items are missing or damaged, contact your distributor or sales representative immediately.

Customer Service

We provide service guide for any problem as follow steps： The first, contact with your distributor, sales representative, or our customer service center for technical support if you need additional assistance. You may have the following information ready before you call：

- Product serial number
- Peripheral attachments
- Software (OS, version, application software, etc.)
- Description of complete problem
- The exact wording of any error messages

In addition, free technical support is available from our engineers every business day. We are always ready to give advice on application requirements or specific information on the installation and operation of any of our products. Please do not hesitate to call or e-mail us.

Safety Precautions

- **Warning!**

Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronic personnel should open the PC chassis.

- **Caution!**

Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components in a static-dissipative surface or static-shielded bag when they are not in the chassis.

Safety and Warranty

1. Please read these safety instructions carefully.
2. Please keep this user's manual for later reference.
3. Please disconnect this equipment from any AC outlet before cleaning. Do not use liquid or spray detergents for cleaning. Use a damp cloth.
4. For pluggable equipment, the power outlet must be installed near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall could cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient over-voltage.
12. Never pour any liquid into an opening. This could cause fire or electrical shock.
13. Never open the equipment. For safety reasons, only qualified service personnel should open the equipment.
14. If any of the following situations arises, get the equipment checked by service personnel:
    A. The power cord or plug is damaged.
    B. Liquid has penetrated into the equipment.
    C. The equipment has been exposed to moisture.
    D. The equipment does not work well, or you cannot get it to work according to the user's manual.
    E. The equipment has been dropped and damaged.
    F. The equipment has obvious signs of breakage.
15. Do not leave this equipment in an uncontrolled environment where the storage temperature is below -20° C (-4°F) or above 60° C (140° F). It may damage the equipment.

Revision History

Version	Date	Note	Author
1.0	2014.08.27	First Release	Woody Huang

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CHAPTER 1

General Information

This chapter includes the FA30 Motherboard background information.

Sections include:

- Introduction
- Feature
- Motherboard Specification
- Function Block
- Board Dimensions

Chapter 1 General Information

1.1 Introduction

FA30 SBC is an integrated package that provides customers a complete RISC platform for project evaluation, application development and solution feasibility testing that decreases lead-time and lowers initial cost and investment.

In peripheral connectivity, FA30 SBC features with two LAN port, two USB 2.0 A-type connectors, one isolated CANBUS connector (combined 2 CANBUS), one isolated expansion port (combined two 24V device port and 3 pin GPIO), one Micro USB OTG, one Micro USB debug port, and one SD card reader.

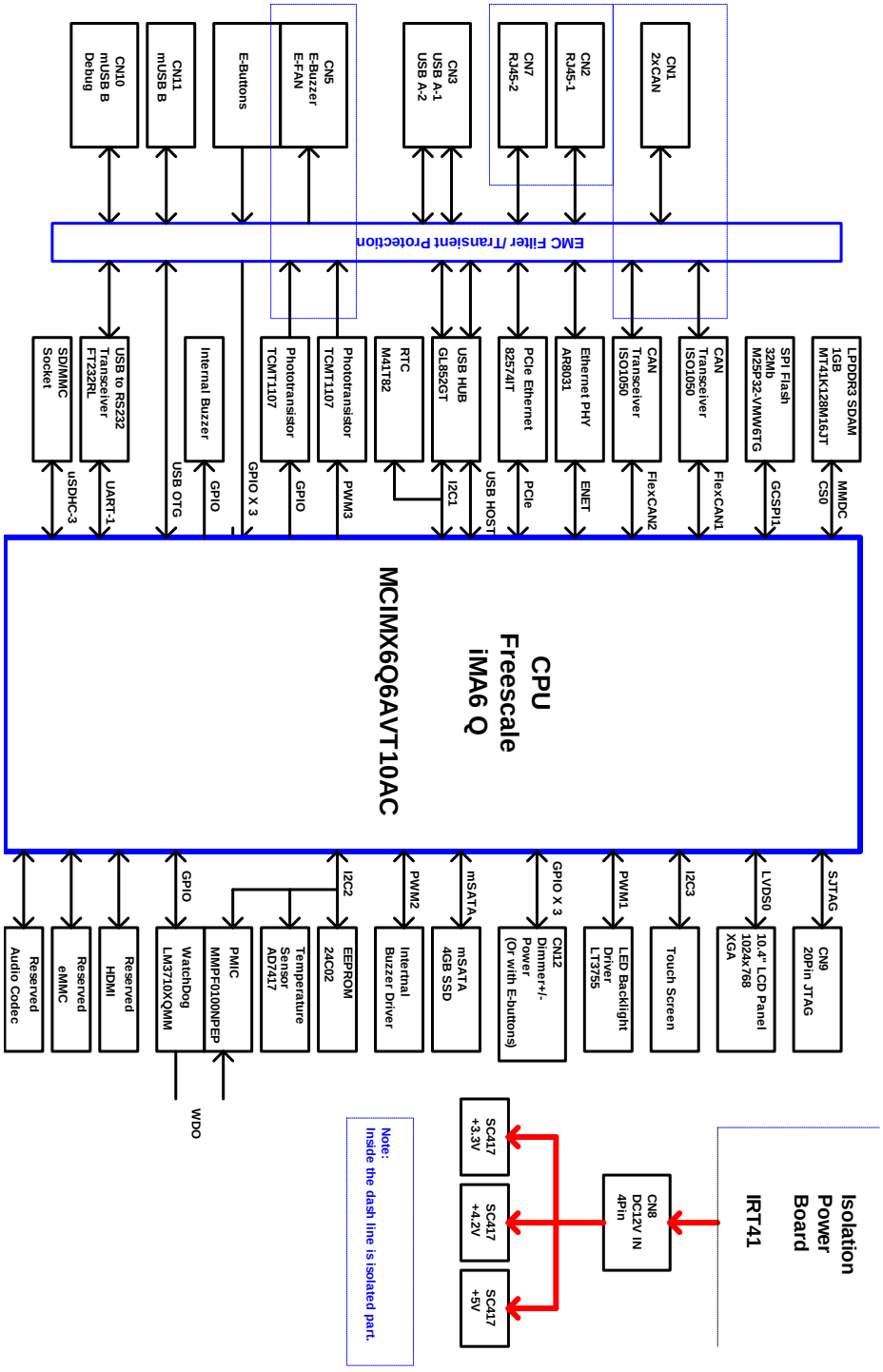
1.2 Feature

- 144mm x 115.28mm
- Supports Freescale Cortex™ – A9 iMX6 Quad 1GHz processor
- Android 4.2.2 / Linux supported
- LVDS interface supporting up to 1920x1200
- 1 x SD/SDHC Card Slot
- 2 x 10/100/1000 LAN
- 2 x USB 2.0 A-type
- 1 x Micro USB OTG supported
- 1 x mini PCIe mSATA SSD supported
- 1 x I2C touch supported(by FPC connector)
- 1 x Isolated expansion port(2 x 24V Device Port which max 12W, 1 x 3pin Digital Input)
- 1 x Isolated CAN 2.0B(2 CAN ports in one connector)

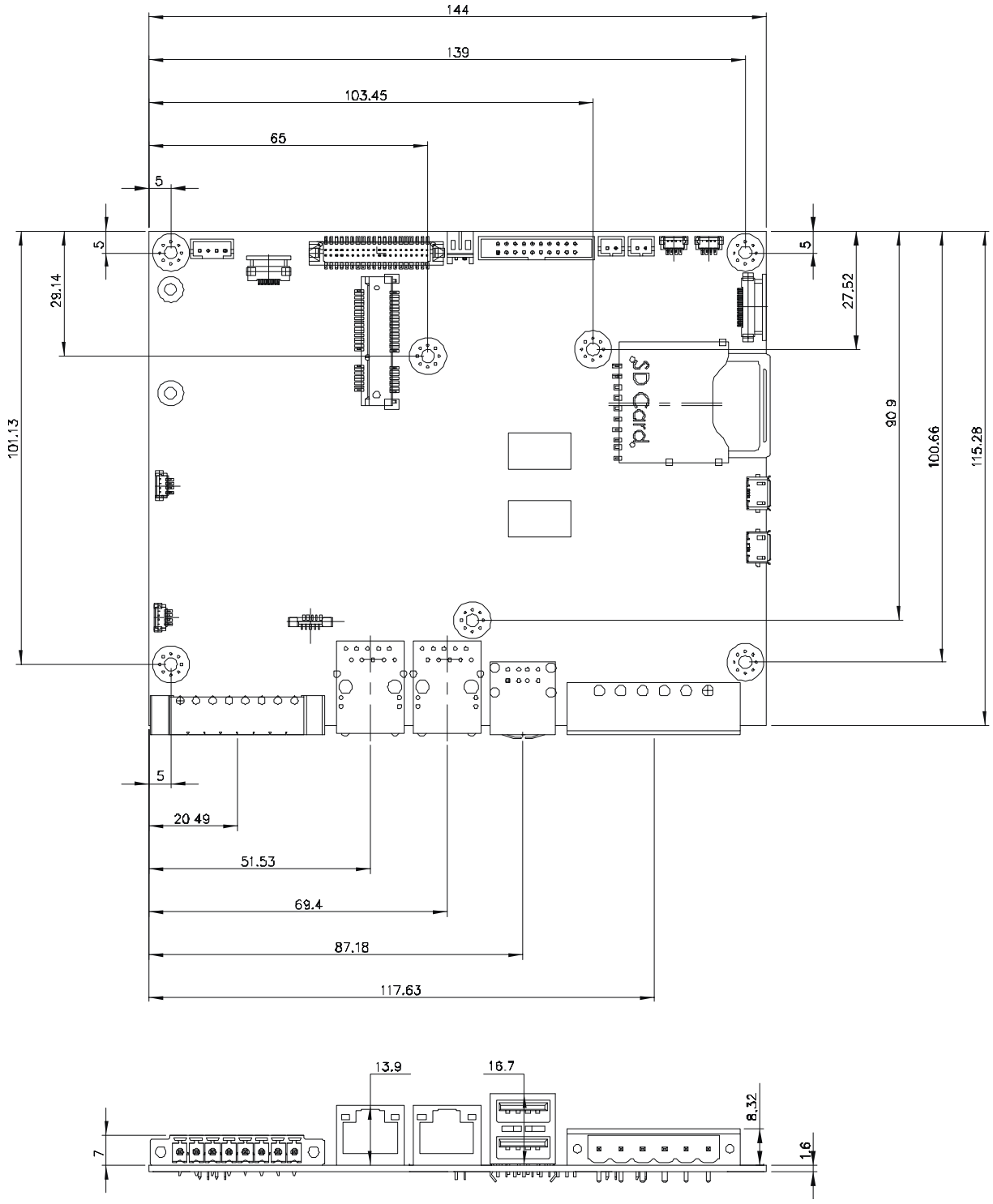
1.3 Motherboard Specifications

CPU Type	Freescale Cortex A9 iMX6Q 1GHz
CPU Speed	1 GHz
LCD interface	LVDS interface supporting up to 1920x1200
LAN	IEEE 802.3/802.3u 10/100 Base-T
Memory Type	LPDDR3 SDRAM 1GB
Storage	Support mini PCIe mSATA SSD storage device Optional eMMC Max with 32GB
Graphic	PowerVR SGX 3D Gfx
Audio	Internal Buzzer 85dBA/30cm, two stereo speaker(L/R) and one Mic by pin-header.
Watchdog Timer	Watchdog timer with 4 channel supply monitor
Edge Connectors	1 x Isolated expansion port(2 x device port with 24V DC, Max 12W and 3 x Digital Input) 2 x LAN 10/100/1000 2 x USB 2.0(USB A-type) 1 x Isolated CAN 2.0B(2 CAN ports in one connector) 2 x Micro USB AB-type(1 x OTG USB 2.0, 1 x Debug Port) 1 x SD Card Slot(Compatible with SDHC)
On Board Pin-Header Connectors	1 x 12V DC Power Input by pin-header 1 x I2C Touch by FPC connector 1 x LVDS by pin-header (up to 1920x1200) 1 x LED backlight power supply(PWM and without build in backlight driver board panel only) 2 x Speaker(L/R) by pin-header 1 x Mic by pin-header 1 x HDMI by FPC connector 2 x USB 2.0 in one connector by pin-header 1 x mSATA SSD Slot 1 x keypad by FPC connector
Dimensions	144 mm x 115.28 mm
Mechanical & environmental	Operating temperature: -10 deg. C to 60 deg. C Operating Humidity: 10 ~ 90% Relative humidity, non-condensing

1.4 Function Block



1.5 Board dimensions



CHAPTER 2

Installations

This chapter provides information on how to use the jumps and connectors on the FA30 Motherboard.

The Sections include:

- I / O Equipment Installation
- Switches and Connectors
- Switch Setting
- Connector and Pin Assignment

Chapter 2 Installations

2.1 I/O Equipment Installation

2.1.1 12V DC-IN

The Motherboard allows plugging 12V DC-IN with pin-header on board without additional power module converter.

2.1.2 Isolated expansion port

There are 8pin isolated expansion port on board which can support two 24V DC device and 3pin GPIO.

2.1.3 Ethernet interface

The Motherboard is equipped with two RJ-45 jack which is fully compliant with the 10/100/1000 Mbps Ethernet protocol compatible. It is supported by major network operating systems.

2.1.4 USB ports

FA30 have four USB port which two as A-type connector and others as pin-header. The USB ports support hot-plug connection.

2.1.5 Isolated CAN BUS

Two CANBUS combined in one connector and with isolated design.

2.1.6 Micro USB ports

Two Micro USB connectors which one for OTG USB 2.0 and other is debug port.

2.1.7 Audio function

The audio interface includes three pin-header connectors on board: two for Stereo Speaker out (L/R) and one Mic in.

2.1.8 LVDS connector

FA30 can support LVDS interface panel and resolution up to 1920*1200. For more information please contact local distributor or sales representative.

2.1.9 LED backlight power supply

Please contact local distributor or sales representative for more detail about this.

2.2 Switches and Connectors

Isolated expansion port(2*24V DC device port and 3pin Digital Input)

2*LAN

2*USB A type

Isolated CAN BUS

12V DC Power Input

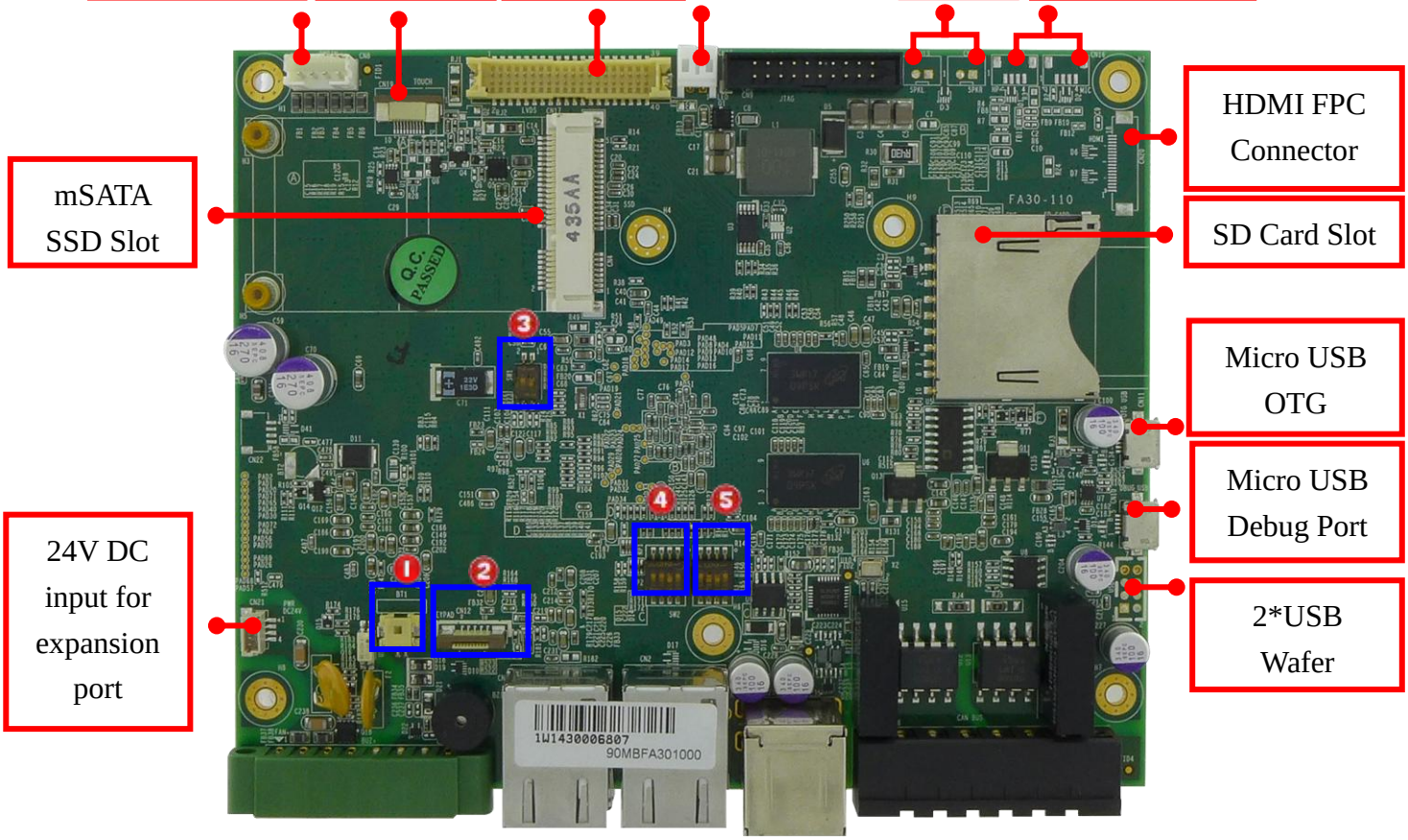
I2C Touch Connector

LVDS Connector

LED Power Supply

SPK (L/R)

Mic & Headphone



mSATA SSD Slot

HDMI FPC Connector

SD Card Slot

Micro USB OTG

Micro USB Debug Port

2*USB Wafer

24V DC input for expansion port

1. BT1-Button Cell Battery connector
2. CN12- Keypad FPC connector
3. SW1
4. SW2
5. SW3

2.3 Switch Setting

There are 3 switches on FA30 and the switch setting combination will decide its boot up path such as from eMMC, mSATA SSD or SD card. If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes.

2.3.1 Boot from SD Card Setting

SW1	OFF	ON	SW2	OFF	ON	SW3	OFF	ON
1		O	1	O		1	O	
2	O		2		O	2	O	
			3	O		3		O
			4	O		4	O	

2.3.2 Boot from eMMC Setting

SW1	OFF	ON	SW2	OFF	ON	SW3	OFF	ON
1		O	1	O		1		O
2	O		2		O	2		O
			3		O	3	O	
			4	O		4		O

2.3.3 Boot from mSATA SSD

SW1	OFF	ON	SW2	OFF	ON	SW3	OFF	ON
1		O	1	O		1	O	
2	O		2	O		2	O	
			3		O	3		O
			4	O		4	O	

2.4 Connectors and Pin Assignment

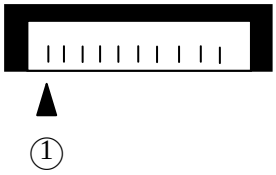
The table below lists the function of each of the board's connectors.

Label	Function	Note
CN8	12V DC input	4Pin header
CN19	I^2C Touch Connector	10p P:0.5mm for FPC
CN17	LVDS LCD Output	2*20p P:1.25mm
CN18	LED Backlight Power	2 Pin header
CN13	SPK_L	2 Pin header
CN14	SPK_R	2 Pin header
CN15	Headphone	4Pin header
CN16	Mic	4Pin header
CN20	HDMI FPC Connector	18p P:0.5mm for FPC
CN6	SD Card Slot	
CN11	Micro USB(OTG)	5 Pin Micro USB
USB1	USB Wafer(2*USB)	8Pin header
CN1	CANBUS Connector	Combine 2*CANBUS
CN3	Dual USB 2.0 A-type	
CN2	RJ45 LAN Connector	
CN7	RJ45 LAN Connector	
CN12	Keypad Connector	4p P:1.0mm for FPC
CN5	Isolated Expansion Port	2*Device port and 3p GPIO
CN21	24V DC in for Expansion Port	4Pin header
CN4	mSATA SSD Connector	Mini PCIe Socket

2.4.1 CN8: 12V DC input

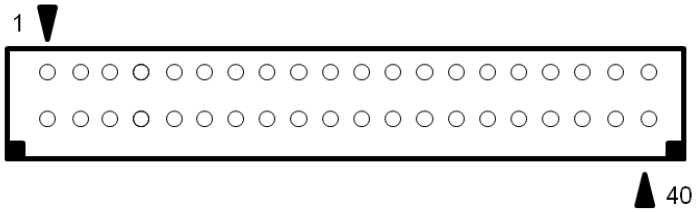
PIN	NAME
1	DC_IN
2	DC_IN
3	DC_GND
4	DC_GND

2.4.2 CN19: I2C Touch Connector



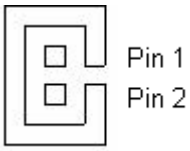
PIN	NAME	PIN	NAME
1	NC	6	GND
2	NC	7	Touch_INTR
3	NC	8	Touch_I2C2_SDA
4	Touch_VCC	9	Touch_I2C2_SCL
5	Touch_VCC	10	Touch_RST

2.4.3 CN17: LVDS Connector



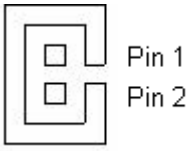
Pin No.	SYMBOL	Pin No.	SYMBOL
1	LCDVDD	21	GND
2	LVDS0_TX0_N_F	22	LVDS1_TX0_N_F
3	LCDVDD	23	GND
4	LVDS0_TX0_P_F	24	LVDS1_TX0_P_F
5	LCDVDD	25	GND
6	LVDS0_TX1_N_F	26	LVDS1_TX1_N_F
7	GND	27	GND
8	LVDS0_TX1_P_F	28	LVDS1_TX1_P_F
9	GND	29	GND
10	LVDS0_TX2_N_F	30	LVDS1_TX2_N_F
11	GND	31	GND
12	LVDS0_TX2_P_F	32	LVDS1_TX2_P_F
13	GND	33	GND
14	LVDS0_CLK_N_F	34	LVDS1_CLK_N_F
15	GND	35	GND
16	LVDS0_CLK_P_F	36	LVDS1_CLK_P_F
17	GND	37	GND
18	LVDS0_TX3_N_F	38	LVDS1_TX3_N_F
19	GND	39	GND
20	LVDS0_TX3_P_F	40	LVDS1_TX3_P_F

2.4.4 CN18: LED Backlight Power



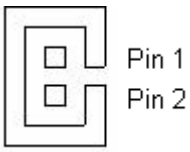
PIN	NAME
1	V+
2	V-

2.4.5 CN13: SPK_L



Pin	NAME
1	LOUT+
2	LOUT-

2.4.6 CN14: SPK_R



Pin	NAME
1	ROUT+
2	ROUT-

2.4.7 CN15: Headphone

PIN	NAME	PIN	NAME
1	Headphone_DET	4	GND_ANALOG
2	Headphone_L	5	GND_ANALOG
3	Headphone_R	6	GND_ANALOG

2.4.8 CN16: Mic

PIN	NAME	PIN	NAME
1	MICROPHONE_DET	4	GND_ANALOG
2	MIC_RAW	5	GND_ANALOG
3	MICBIAS2_RAW	6	GND_ANALOG

2.4.9 CN20: HDMI FPC Connector

PIN	NAME	PIN	NAME	PIN	NAME	PIN	NAME
1	GND	6	DDC_DATA	11	TMDS0-	16	HPD1
2	TMDS2-	7	GND	12	TMDS0+	17	+5V
3	TMDS2+	8	TMDS1-	13	GND	18	+5V
4	GND	9	TMDS1+	14	CLK+	19	NC
5	DDC_CLK	10	GND	15	CLK-	20	NC

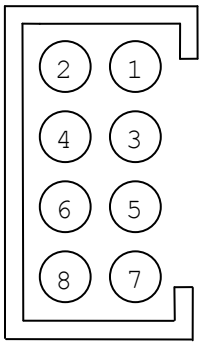
2.4.10 CN6: SD Card Slot

Pin	NAME	Pin	NAME	Pin	NAME
1	SD_DATA3	6	GND	11	GND
2	SD_CMD	7	SD_DATA0	12	SD_WP
3	GND	8	SD_DATA1	13	GND
4	VDDSHV4	9	SD_DATA2	14	NC
5	SD_CLK	10	SD_CD#	15	NC

2.4.11 CN11: Micro USB(OTG)

PIN	NAME	PIN	NAME
1	OTG_VBUS	7	GND
2	USB_OTG_CON_DN	8	GND
3	USB_OTG_CON_DP	9	GND
4	USB0_OTG_ID	10	NC
5	GND	11	NC
6	GND		

2.4.12 USB Wafer (2*USB)

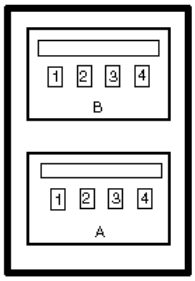


Pin	SYMBOL	Pin	SYMBOL
2	USBVCC	1	USBVCC
4	USB -	3	USB -
6	USB +	5	USB +
8	GND	7	GND

2.4.13 CN1: CANBUS Connector

PIN	NAME	PIN	NAME
1	GND	4	GND
2	CANL_2_CONN_L	5	CANL_1_CONN_L
3	CANH_2_CONN_L	6	CANH_1_CONN_L

2.4.14 CN3: Dual USB 2.0 A-type



PIN	NAME
1	VCC_5V
2	Data-
3	Data+
4	GND

2.4.15 CN2: RJ45 LAN Connector

PIN	NAME	PIN	NAME	PIN	NAME	PIN	NAME
1	TX1+	5	POWER	9	TX4+	13	GLED
2	TX1-	6	DGND	10	TX4-	14	OLED
3	TX2+	7	TX3+	11	YLED	15	SHIELD
4	TX2-	8	TX3-	12	LED GND	16	SHIELD

2.4.16 CN7: RJ45 LAN Connector

PIN	NAME	PIN	NAME	PIN	NAME	PIN	NAME
1	TX1+	5	POWER	9	TX4+	13	GLED
2	TX1-	6	DGND	10	TX4-	14	OLED
3	TX2+	7	TX3+	11	YLED	15	SHIELD
4	TX2-	8	TX3-	12	LED GND	16	SHIELD

2.4.17 CN12: Keypad Connector

PIN	NAME	PIN	NAME
1	CPUPWRON_C	4	GND
2	DIMM-_C	5	GND
3	DIMM+_C	6	GND

2.4.18 CN5: Isolated Expansion Port

Pin	NAME	Pin	NAME
1	VCC	5	Digital Input
2	GND	6	Digital Input
3	VCC	7	Digital Input
4	GND	8	GND

2.4.19 CN21: 24V DC in for Expansion Port

PIN	NAME
1	VCC
2	VCC
3	GND
4	GND

2.4.20 CN4: mSATA SSD Connector

PIN	NAME	PIN	NAME	PIN	NAME	PIN	NAME
1	RESERVED	14	RESERVED	27	GND	40	GND
2	+3.3V	15	GND	28	+1.5V	41	+3.3V
3	RESERVED	16	RESERVED	29	GND	42	RESERVED
4	GND	17	RESERVED	30	SMB_CLK	43	GND
5	RESERVED	18	GND	31	TX-	44	RESERVED
6	+1.5V	19	RESERVED	32	SMB_DATA	45	VENDOR
7	RESERVED	20	RESERVED	33	TX+	46	RESERVED
8	RESERVED	21	GND	34	GND	47	VENDOR
9	GND	22	RESERVED	35	GND	48	+1.5V
10	RESERVED	23	RX+	36	RESERVED	49	DA/DSS
11	RESERVED	24	+3.3V	37	GND	50	GND
12	RESERVED	25	RX-	38	RESERVED	51	DET#
13	RESERVED	26	GND	39	+3.3V	52	+3.3V